

METHOD OF FABRICATING SUB-100 NANOMETER FIELD EMITTER TIPS COMPRISING GROUP III-NITRIDE SEMICONDUCTORS

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ABSTRACT

A method of producing a field emission device includes laying a group III-nitride semiconductor layer over a substrate, placing a photoresist mask over the group III-nitride semiconductor layer, patterning a generally circular grid in the photoresist mask and the group III-nitride semiconductor layer, and forming the group III-nitride semiconductor layer into generally pointed tips using an inductively coupled plasma dry etching process, wherein the group III-nitride semiconductor layer comprises a group III-nitride semiconductor material having a low positive electron affinity or a even a negative electron affinity, wherein the inductively coupled plasma dry etching process selectively creates an anisotropic deep etch in the group III-nitride semiconductor layer, and wherein the inductively coupled plasma dry etching process creates an isotropic etch in the group III-nitride semiconductor layer. Preferably, the photoresist layer is approximately 1.7 microns in thickness, and the fabricated tips have a radius of curvature of less than 100 nanometers.